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<u>In the Specification:</u>

Please replace the following amended paragraphs:

Page 1, lines 2 to 3 insert the following paragraph:

<u>This application claims the benefit under 35 U.S.C.119 (e) of U.S. provisional application Serial No. 60/453,482, filed December 12, 2003.</u>

Page 2, lines 11 to 18 replace the following paragraph:

The pressure projection method is the most common approach to solving the incompressible Navier-Stokes fluid flow equations in the context of computational fluid dynamics. The pressure projection method involves calculating first the solution to all the components of the Navier-Stokes equation except the pressure projection term and then the effect of the pressure term is integrated as a separate step yielding the full Navier-Stokes. This procedure is outlined in detail in [Stam 1999] <u>Stam, J. Stable Fluids. *SIGGRAPH 1999 Conference Proceedings.* ACM Press</u>, and [Foster & Fedkiw 2001] <u>Foster, N. and Fedkiw, R. Practical Animation of Liquids. *SIGGRAPH 2001 Annual Conference,* 12-22, 2001.</u>

Page 3, lines 2 to 4 replace the following paragraph:

The Figures 2, 3, 4 and 5 in this section are reproduced from [Versteeg & Malalasekera 1995] <u>Versteeg, H.K. & W. Malalasekera. *An Introduction to Computational Fluid Dynamics: The Finite Volume Method.* Prentice Hall. 1995.</u>

Page 9, lines 4 to 6 replace the following paragraph:

In-Figure 9 is similar to figure 8 except that the black occlusion regions have been removed thus exposing the red underlying velocities that have been set using the improved description above.

Page 10, lines 8 to 17 replace the following paragraph:

In order to unify all of the occlusions affecting the simulation, we represent their geometry using a level set instead of relying on a polygon mesh

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directly (as was done in (Foster and Fedkiw 2001) Foster, N. and Fedkiw, R. Practical Animation of Liquids. _SIGGRAPH 2001 Annual Conference_, 12-22, 2001 and (Enright, et al 2002)) Enright, D., Marschner, S. and Fedkiw, R. Animation and Rendering of Complex Water Surfaces, _ACM Trans. On Graphics (SIGGRAPH 2002 Proceedings) 21_, 736-744, 2002. A level set alone · can only capture the instantaneous geometry of the occlusions, thus it cannot model the effects of the occlusion velocities and slip conditions. We store this information in two addition fields – a vector field for the velocities and a scalar field for the slip conditions. We denote the level set, occlusion velocity field, and slip condition field by the following set:

Page 13, lines 10 to 21 replace the following paragraph:

The advection velocity field, which is used to advect both the level set and the fluid velocity field, must accurately account for the occlusions. This is achieved via our new method of _constrained velocity extrapolation_. This is similar to the method described in (Enright 2002) Enright, D., Marschner, S. and Fedkiw, R. Animation and Rendering of Complex Water Surfaces. _ACM Trans. On Graphics (SIGGRAPH 2002 Proceedings) 21_, 736-744, 2002 for extrapolating fluid velocities into the air, the main distinction however, besides the fact that we are extrapolating into occlusions rather than the air, is that constraints are imposed on the velocities after extrapolation. These constraints reflect the effects of three space varying aspects of the occlusions: _the slip coefficient, the surface orientation_, and _the velocity_. It is convenient to calculate the resulting constrained velocity as the sum of two orthogonal components – one parallel to the occlusion normal and the other perpendicular:

Page 14, lines 5 to 16 cancel the following paragraphs:

References

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~~Enright, D., Marschner, S. and Fedkiw, R. Animation and Rendering of Complex Water Surfaces. *ACM Trans. On Graphics (SIGGRAPH 2002 Proceedings) 21*, 736-744, 2002.~~

~~Foster, N. and Fedkiw, R. Practical Animation of Liquids. *SIGGRAPH 2001 Annual Conference*, 12-22, 2001.~~

~~Foster, N., and Metaxas, D. Realistic Animation of Liquids. *Graphical Models and Image Processing 58*, 471-483, 1996.~~

~~Stam, J. Stable Fluids. *SIGGRAPH 1999 Conference Proceedings*. ACM Press.~~

~~Versteeg, H.K. & W. Malalasekera. *An Introduction to Computational Fluid Dynamics: The Finite Volume Method*. Prentice Hall. 1995.~~